

Claims

1. A method for producing a porous material which comprises (i) partially curing a phenolic resin to a solid; (ii) grinding the solid to form resin particles; (iii) mixing the resin particles with particles of a secondary component; (iii) forming the mixture into a dough; (iv) shaping the dough to obtain a shaped solid product and (v) sintering the shaped solid so as to produce a form-stable sintered product.
2. A method as claimed in claim 1 in which the partially cured phenolic resin is a Novolak resin as herein described.
3. A method as claimed in claim 1 or 2 in which a cage structure is created by the resin that retains the secondary component or components without substantially changing the porosity of the secondary component.
4. A method as claimed in any one of the preceding claims in which the secondary component comprises a carbon powder, graphite, a metal, an inorganic oxide, silicon or a mixture thereof.
5. A method as claimed in claim 4 in which the secondary component is an activated carbon powder.
6. A method as claimed in claim 5 in which the activated carbon is a mesoporous activated carbon with a mean pore size in the 1-5nm range.
7. A method as claimed in claim 4 in which the secondary component is selected from amorphous oxides, zeolites, layered clays and silica.
8. A method as claimed in claims 1 or 2 in which the secondary component is a mixture of a pore former and a partially cured phenolic resin.
9. A method as claimed in claim 8 in which the pore former is ethylene glycol, 1,4-butylene glycol, diethylene glycol, triethylene glycol, gamma-butyrolactone,

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propylene carbonate, dimethylformamide, N¹-methyl-2-pyrrolidinone or monoethanolamine.

5 10. A method as claimed in any one of claims 1 to 4 in which the secondary component does not add to the porosity of the composite but serves to modify the physical properties of the composite.

10 11. A method as claimed in claim 10 in which the physical property is electrical conductivity, thermal capacity or magnetic susceptibility.

12. A method as claimed claim 11 in which the secondary component is an electrically conducting material.

15 13. A method as claimed in claim 12 in which the secondary component is a graphite powder.

14. A method as claimed in claim 12 in which the secondary component is a metal.

20 15. A method as claimed in claim 13 in which the secondary component is copper, tungsten or aluminium.

25 16. A method as claimed in claim 4 in which the secondary component is a silicon powder; silicon monoxide powder; or a mixture of carbon or silicon with silica and silicon carbide is formed by the sintering process.

17. A method as claimed in claim 4 in which the secondary component is a tungsten and molybdenum oxide and a carbide is formed during the sintering process.

30 18. A method as claimed in any one of the preceding claims in which the sintered material is further activated by treatment with steam or carbon dioxide.

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19. A method as claimed in any one of the preceding claims in which the porous material is further treated by heating to temperatures above 1000°C.

5 20. A method as claimed in any one of the preceding claims in which the dough is shaped by extrusion, pressing, moulding or spray drying.

21. A porous sintered product made by the method of any one of the preceding claims.

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22. A porous sintered product which comprises a porous monolithic carbon structure which incorporates a secondary component selected from carbon powders, graphite, metals, silicon and inorganic oxides.

15 23. A porous sintered product as claimed in claim 22 in which the secondary component comprises a carbon powder, graphite, a metal, an inorganic oxide, silicon or a mixture thereof.

20 24. A porous sintered product as claimed in claim 23 in which the secondary component is an activated carbon powder.

25. A porous sintered product as claimed in claim 24 in which the activated carbon is a mesoporous activated carbon with a mean pore size in the 1-5nm range.

25 26. A porous sintered product as claimed in claim 22 in which the secondary component is selected from amorphous oxides, zeolites, layered clays and silica.

27. A porous sintered product as claimed in claim 22 in which the secondary component is a mesoporous carbon.

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28. A porous sintered product as claimed in claim 22 in which the secondary component does not add to the porosity of the composite but serves to modify the physical properties of the composite.

5 29. A porous sintered product as claimed in claim 28 in which the physical property is electrical conductivity, thermal capacity or magnetic susceptibility.

30. A porous sintered product as claimed in claim 29 in which the secondary component is an electrically conducting material.

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31. A porous sintered product as claimed in claim 30 in which the secondary component is a graphite powder.

15 32. A porous sintered product as claimed in claim 30 in which the secondary component is a metal.

33. A porous sintered product as claimed in claim 30 in which the secondary component is copper, tungsten or aluminium.

20 34. A porous sintered product as claimed in claim 22 which comprises a controlled resistivity porous carbon structure incorporating an electrically conducting oxide system as the secondary component.

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